

Appl. No. 10/607,633
Amdt. dated April 4, 2005
Response to Office Action of January 4, 2005

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REMARKS/ARGUMENTS

This Amendment is responsive to the Office Action mailed on January 4, 2005. An RCE is being filed concurrently herewith. In this Amendment, claims 7, 8, 18, 19, 22, and 26 are amended, no claims are canceled, and no claims are added so that claims 7-26 pending are subject to examination.

A number of prior art rejections are made. The prior art rejections are addressed in the order presented in the Office Action.

I. Rejections based on Kojima et al. and Hsuan

Claims 7, 8, 16, and 17 are rejected as being obvious over Kojima et al. (U.S. Patent No. 5,723,900) in view of Hsuan (U.S. Patent No. 6,429,509). According to the Examiner, "Kojima et al. does not specify forming an electrical terminal on the backside, but Hsuan does." According to the Examiner, it would have been obvious to combine Kojima et al. and Hsuan "because it shortens cycle time". This rejection is traversed.

Obviousness has not been established, since each and every limitation is not taught or suggested by the cited art. Independent claim 7 recites "coupling a frontside of the die to the leadframe with solder, *wherein the frontside of the die comprises a second electrical terminal, wherein first electrical terminal and the second electrical terminal are terminals in a MOSFET device*". Independent claim 18 recites "providing a semiconductor die that includes a backside including a first electrical terminal and a frontside including a second electrical terminal, *wherein the first electrical terminal and the second electrical terminal are terminals in an electrical device*." (Emphasis added.)

The Examiner states that Kojima et al. fails to mention an electrical terminal. Accordingly, Kojima et al. cannot teach or suggest a functioning device in a die, wherein the functioning device comprises terminals at the frontside and the backside of the die. Hsuan also fails to teach or suggest this feature.

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There is also no motivation to modify Kojima et al. to arrive at the inventions of claims 7 and 18, with Hsuan or with any other reference, since doing so would be contrary to the intended purpose of Kojima et al.'s embodiments. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP § 2143.01. Specifically, there is no motivation to modify Kojima et al. so that the backside or rear surface 13a of Kojima et al.'s chip 13 has an electrical terminal. For example, referring to FIG. 7 of Kojima et al., Kojima et al. specifically teaches an opening 31 in a circuit board 29 under the rear surface 13a of the chip 13 to improve heat dissipation (c. 5, l. 55-63). In FIG. 8 of Kojima et al., the rear surface 13a of the chip 13 is attached to a heat sink 32. If one were to modify Kojima et al.'s embodiments to provide for an electrical terminal at the rear surface 13a of the disclosed chip 13, then one must connect that electrical terminal to circuit board 29 or else the added electrical terminal would not have any purpose. Also, any proposed modification of Kojima et al. to arrive at the inventions defined by the claims would further require one to eliminate the opening 31 in the embodiment in FIG. 7 and would also require one to remove the heat sink 32 in the embodiment in FIG. 8 so that an electrical connection could be made between the added electrical terminal and the circuit board 29. Clearly, there is no motivation to modify the embodiments in Kojima et al. to arrive at embodiments of the invention, since doing so would be directly contrary to the intended purpose of Kojima et al.'s invention and would require one to completely re-design Kojima et al.'s invention.

A number of additional rejections of various dependent claims are made based on Kojima et al. and Hsuan. For example, claim 9 is rejected as obvious over Kojima et al., Hsuan, and Maejima et al. (U.S. Patent No. 5,347,709). Claims 10-12 are rejected as obvious over Kojima et al., Hsuan, and Orso et al. (U.S. Patent No. 6,018,686). Claims 13 and 15 are rejected as obvious over Kojima et al., Hsuan, and Layher et al. (U.S. Patent No. 4,678,358). These rejections are traversed.

As noted above, the combination of Kojima et al. and Hsuan is improper. The additional citations of Maejima et al., Orso et al., and Layher et al. fail to remedy the deficiencies

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of the improper combination of Kojima et al. and Hsuan et al. Additionally, the rejected dependent claims recite additional features which make them particularly patentable in view of the cited art.

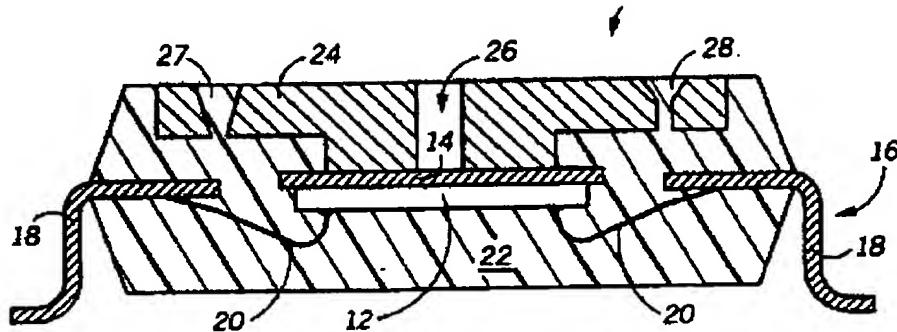
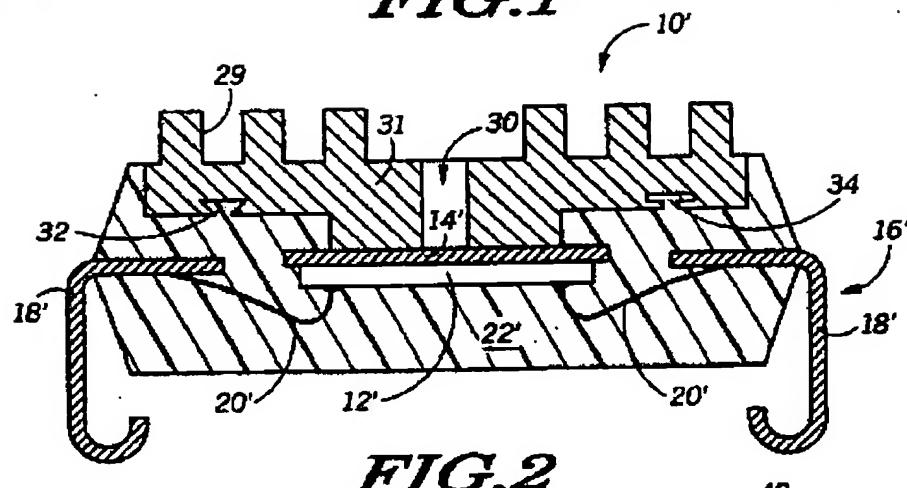
II. Rejections based on McShane et al.

Claims 18, 20, 24, and 25 are rejected as being anticipated by McShane et al. (U.S. Patent No. 5,147,821). The rejection over McShane et al. is again traversed.

McShane et al. fails to teach or suggest a method comprising, *inter alia*, "encapsulating [a] semiconductor die and at least a portion of the leadframe with a molding compound having a window and an exterior surface, wherein the backside of the semiconductor die is exposed through the window of the molding compound *and wherein the backside is substantially flush with the exterior surface of the molding compound*" as recited in independent claim 18. With regard to claim 18, the Office Action states that the "thickness 52 is heuristic and may be quite thin in addition to 'substantially flush' being subjective to the observer, col. 7, line 35 - col. 8, line 10." (Emphasis added.)

As argued previously, FIG. 1 of McShane et al. clearly shows that the exterior surface of the package body 22 is clearly not "substantially flush" with *any* surface of the die 12, let alone the backside of the die 12. FIG. 1 (and FIG. 2) of McShane et al. is reproduced below and as shown, the backside of the die 12 lies against the leadframe 14. The backside of the die is not only not even close to being flush with an exterior surface of McShane et al.'s molding material. To the contrary, the backside of the die 12 is at the most central internal point in McShane et al.'s package and cannot be flush with an external surface of McShane et al.'s molding material.

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In fact, the backside of the die 12 cannot be "substantially flush" with the exterior of the body 22, or else the body 22 would not be able to attach to the heat sink 24 illustrated in FIG. 1. Accordingly, the allegation that FIG. 1 of McShane et al. shows the surface of the die 12 being "substantially flush" with the exterior surface of the body 22 would be based on an unreasonable interpretation of the phrase "substantially flush" and an unreasonable reading of McShane et al. Put another way, to the extent that the Examiner believes that one may "subjectively" interpret the phrase "substantially flush" to read on McShane et al., Applicants submit that such an interpretation would be unreasonable. During patent examination, the claims are given their broadest reasonable interpretation consistent with the specification. *In re Hyatt*,

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211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Again, Applicants submit that the Examiner's interpretation of the claims is "unreasonable", and not reasonable.

Also as argued previously, it would also not have been obvious to have modified McShane et al. to have arrived at the invention defined by independent claim 18. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP § 2143.01. Here, if one were to modify McShane et al. to have a die backside that is substantially flush with the exterior surface of the molding compound, one would have to remove the heat sink 24. The heat sink 24 is a critical part of McShane et al.'s invention. See column 2, lines 58-62 of McShane et al. Accordingly, there is no motivation to modify McShane et al. to arrive at the invention of claim 18 and McShane et al. does not render claim 18 or any claims dependent claims thereon obvious.

In response to Applicant's arguments, at page 10 of the Office Action, the Examiner again alleges that McShane et al. is sketching the thickness of the body 22 "heuristically". The Examiner also states that the "practitioner may optimize the thickness of the molding". (Emphasis added).

Applicants submit that McShane et al. does not suggest that McShane et al.'s drawings are "heuristic" and the Office Action fails to cite any authority that allows the U.S.P.T.O. to interpret drawings "heuristically". Clearly, the allegation that the drawings in prior art patents are heuristic is clearly improper. *Should the Examiner maintain this rejection, the Examiner is requested to provide some authority for "heuristic" applications of the prior art and/or cite a passage from McShane et al. with indicates that McShane et al.'s drawings are not as they appear.*

Further, the Examiner's states that the thickness 52 "may" be quite thin and that one "may optimize" the thickness of McShane et al.'s molding. By alleging that one "may" modify McShane et al. to arrive at the invention of claim 18, the Examiner implicitly acknowledges that the limitation "wherein the backside is substantially flush with the exterior surface of the molding compound" is not explicitly taught by McShane et al. McShane et al. would therefore not "anticipate" claim 18, since each and every element must clearly be shown

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in a prior art reference in order to anticipate a claim. As explained by MPEP § 2131, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

A number of dependent claims are also rejected in view of McShane et al. Claim 23 is rejected as obvious over McShane et al. and Layher et al. Claim 21 is rejected as being obvious over McShane et al. and Fosberry et al. (U.S. Patent No. 6,214,640). Claims 19 and 22 are rejected as being obvious over McShane et al. and Merrill et al. (U.S. Patent No. 5,654,206). Claim 26 is rejected as being obvious over McShane et al. and Vasquez et al. (U.S. Patent No. 5,578,841).

These rejections are traversed. The additional references fail to cure the deficiencies of McShane et al. In addition, as noted above, there is no motivation to modify McShane et al. to arrive at the inventions defined by the claims, since doing so would be contrary to the explicit purpose of McShane et al.'s invention.

CONCLUSION

For the reasons provided above, Applicants submit that the claims are allowable. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,


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